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Environmental Effects of Dredging Technical Notes

SEASONAL RESTRICTIONS ON DREDGING OPERATIONS IN FRESHWATER SYSTEMS

PURPOSE: This note summarizes the status of seasonal restrictions on dredging operations in freshwater navigable waterways. The information presented is based on replies received from a questionnaire sent to all US Army Corps of Engineers (CE) District and Division offices that conduct O&M dredging operations in freshwater systems.

BACKGROUND: Restrictions on dredging operations are used to protect various types of aquatic resources. CE Districts are often required to restrict or suspend dredging operations during a defined period of time to prevent real or perceived detrimental impacts on important species of invertebrates, fish, and birds. The magnitudes of these potential impacts are often speculative or not technically supportable, but are imposed nonetheless until new information becomes available.

Restrictions have historically been placed on dredging operations occurring in coastal systems. However, as dredging of freshwater navigable waterways increases, resource management agencies are imposing new restrictions resulting in contractual delays, increased project costs, and other complications in maintaining a navigable channel throughout the year. To ensure that valuable aquatic resources are adequately protected and prevent unwarranted delays in dredging, a more complete understanding of the scope and nature of seasonal restrictions is needed to assist Corps offices in planning and implementing dredging operations.

ADDITIONAL INFORMATION: Contact one of the authors--Mr. Larry Sanders, (601) 634-2976, or Mr. Jack Killgore, (601) 634-3397--or the Environmental Effects of Dredging Programs (EEDP) Manager, Dr. Robert M. Engler, (601) 634-3624.

Introduction

Resource management agencies often restrict the time and location of CE dredging/disposal operations to minimize potential impacts to important aquatic resources. These restrictions are a major concern to the Corps because they create an added impact on the cost and scheduling of dredging operations. In many cases, the imposition of restrictions is based on limited

information relating to the behavior and survival of species such as fish, birds, and mussels associated with dredging operations. However, since protection of important aquatic resources is an important issue in any navigation-related activity, seasonal restrictions will continue unless perceived impacts are determined to be unwarranted.

A recent survey of coastal and Great Lakes CE Districts indicated that dredging can be delayed, or even cancelled because of the potential effects of elevated suspended sediment concentrations on fish survival, turbidity plumes on the behavior of migrating fishes, dissolved oxygen reduction on aquatic species survival, and physical disturbance of spawning and feeding grounds (LaSalle et al., in preparation). In order to obtain a more complete understanding of the scope and nature of seasonal restrictions throughout the United States, a survey of inland waterway CE District and Division offices was also conducted in the Fall of 1988 and the results are presented herein.

Twenty-six individuals, representing 29 District and Division offices, were asked to provide the following information on existing restrictions: (1) the subject of the restriction, (2) the specific reason(s) for the restriction, (3) the project type and specific activities of concern, (4) the dates of restriction, and (5) the agency suggesting the restriction. In addition there was a section for general comments.

Survey Results

Approximately 70 percent of the people asked to participate in the survey responded. Table 1 identifies those District and Division offices that responded to the survey. In most cases, similar restrictions applied to both coastal and inland waterway CE offices, although the species of concern varied by geographical region. Six Districts reported no restrictions because of limited dredging requirements, while other Districts indicated extensive restrictions usually due to the presence of commercially valuable or threatened species of fish.

Subject of restrictions. The most common subject of seasonal restrictions was related to either individual or groups of sport and anadromous fishes (Table 2). Other topics included endangered species (sturgeon, mussels), water quality, migratory waterfowl, and nesting birds. The highest number of individual species being protected through seasonal restrictions was

reported by the Pacific Ocean Division (11) followed by the Walla Walla District (5).

Reason for restriction. The primary reason given for seasonal restrictions was the potential impacts on fish and their habitat (Table 3). Those issues of major concern were loss of habitat; disruption of spawning for certain species; entrainment of fish eggs and larvae; high mortality of eggs and larvae due to smothering and clogging of gills caused by suspended sediment; change in functional utilization of habitat for feeding, cover, and overwintering; and potential blockage of migratory pathways of various anadromous species due to their reluctance to pass through turbidity plumes. Other reasons listed included noise impairment on migratory birds, potential degradation of water quality (primarily turbidity and dissolved oxygen (DO) reduction), and concern regarding contaminant release.

Project type or activity of concern. Maintenance dredging was the most common operation affected by seasonal restrictions (Table 4). Other operations included channel improvement, bank reshaping, commercial sand and gravel dredging, and hopper dredge overflow. Disposal operations listed were in-water, overboard, and upland. An increase in barge/scow travel to approved disposal sites was also mentioned which would directly increase the cost of disposal operations. Restrictions often applied to dredging projects regulated by the CE under Section 10 of the Rivers and Harbor Act and Section 404 of the Clean Water Act.

Dates of restrictions. Restrictions usually occurred in the spring and early summer. As a result, most dredging took place during the winter when most species of concern have migrated out of the area or were not involved in spawning or rearing in the vicinity of the dredging or disposal operations. In some cases, Districts are required to monitor water quality and other potential physical impacts during dredging operations to ensure there are no detrimental impacts to existing resources. If any significant changes occurred, then dredging may be suspended by the resource agency.

Agencies suggesting the restrictions. Restrictions were placed upon CE dredging operations by one or more state resource agencies. In order that Federal activities are consistent with approved state management programs, the CE complies with restrictions usually through memorandums of agreement pending further evaluation of potential impacts. Federal agencies such as the US Fish and Wildlife Service, the US Environmental Protection Agency, and the National

Marine Fisheries Service also took part in the negotiations, particularly if endangered species or commercial fish stocks were involved.

Discussion of Survey Results

The nature of seasonal restrictions imposed on CE dredging operations is similar in both coastal and inland waterway districts. Most restrictions are related to activities which may have a potential negative impact on fish and their habitat, such as physical disruption of spawning sites or degradation of certain water quality parameters. A resource of particular concern is anadromous fish species, including salmon, striped bass, and shad.

There is often inadequate data to substantiate the validity of certain seasonal restrictions, but concern over potential impacts necessitates compliance with the resource agency's decisions. Direct impacts of dredging operations on aquatic resources, such as benthic burial or alteration of spawning sites, require that restrictions be placed on certain areas or during specific time periods. However, other issues of concern that are not well-defined or for which there is no direct evidence to support impact statements can be investigated through well designed field studies. For example, the question of turbidity plumes altering migratory pathways of anadromous fishes is a concern shared by many CE offices, but no direct evidence supports such a contention. As new information is obtained, the validity of certain restrictions should be reevaluated.

Reference

LaSalle, M. W., Homziak, J., Lunz, J. D., Clarke, D. G., and Fredette, T. J. "Seasonal Restrictions on Dredging and Disposal Operations," Technical Report (in preparation), US Army Engineer Waterways Experiment Station, Vicksburg, MS.

Table 1

Corps of Engineers Divisions and District Offices Responding to Survey

Division/District	Abbreviation
Memphis	LMM
St. Louis	LMS
Kansas City	MRK
Omaha	MRO
Baltimore	NAB
New York	NAN
Norfolk	NAO
Philadelphia	NAP
Buffalo	NCB
Detroit	NCE
Walla Walla	NPW
Ohio River	ORD
Huntington	ORH
Nashville	ORN
Pittsburgh	ORP
Pacific Ocean	POD
Jacksonville	SAJ
Mobile	SAM
Savannah	SAS
Wilmington	SAW
Sacramento	SPK
Fort Worth	SWF
Galveston	SWG
Little Rock	SWL

Table 2

Summary on the Subject of Seasonal Restrictions

Subject of Restriction	CE Divisions/Districts
Sport fish	SPK, NAN, ORN, NCB, ORP, NCE, NPW, NAO, ORD, SAJ, SAM, NAP
Anadromous fish*	SPK, NAB, SAW, NPW, SAM, NAP, NAN, SAJ, NAO
No restrictions	SWG, LMS, SWF, MRO, LMM, MRK
Fisheries (general)	NCB, ORH, ORD, SAJ
Fish spawning (general)	SPK, ORN, ORP, NCE
Bird nesting	POD, NCE, SWL, SPK
Water quality	NAN, NCE, SAJ, SAS
Sturgeon	NAN, NPW, SAM, NAP
Recreational activities and/or aesthetics	SAJ, NCE
Mussels/snails	POD, SWL
Shrimp	SAW, POD
White bass	ORN
Goby's	POD

* Anadromous fish which were mentioned included striped bass (*Morone saxatilis*), Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Salmo gairdneri*), blueback herring (*Alosa aestivalis*), and American shad (*Alosa sapidissima*).

Table 3

Reasons for Seasonal Restrictions

Topic	CE Divisions/Districts
Avoid degradation of recreational waters, fisheries, and aquatic vegetation	SPK, NAN, ORN, NCB, ORP, NAB, SAW, NCE, ORH, NPW, NAO, SAJ, SAM, POD, NAP, SAS
Degraded water quality (DO, temperature, turbidity)	NAN, NCB, NPW, SAJ, NAP, SAS, SPK, SPK, NCE, ORH, NAO
Turbidity influence on fish spawning and migration	SPK, NAN, ORN, NCB, NCE, ORH, NPW, NAO, SAJ, NAP
Loss or change in functional use of fish habitat	SPK, NAN, NCB, ORP, NCE, ORH, NPW, NAO, SWL
Physical disturbance of fish spawning habitat	SPK, NCE, ORH, NAO, NCB
Protect fish nursery habitat	NAN, NCB, SAW, NPW
Noise impairment of migratory bird nesting	SPK, SWL, POD
Entrainment	NPW, SAM, NAP
Release of contaminants	NCE, NPW
Preservation of shallow-water habitat	ORP
Benthic burial	SAS

Table 4

Project Type or Activity of Concern Affected by Seasonal Restrictions

Project Type	CE Divisions/Districts
Maintenance dredging	NAN, SAW, ORH, ORD, SAM, SAS
Dredging (general)	NCB, NAB, POD, NAP
Commercial sand and gravel dredging	ORP, SWL
Hopper dredge overflow	NCE, NPW
In-water construction	ORH, POD
Upland disposal	NAB, SAJ
Bank reshaping and toe trench excavation	SPK
Channel improvement and bendway removal	ORN
In-water disposal	NPW
Barge/scow travel to disposal sites	NAO
Hydraulic cutterhead dredging	NAO
Bucket dredging or overboard disposal	NAP
Blasting and fill	NAP